UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/574,434	04/03/2006	Robert Frederick Milsom	DE03 0342 US1	9692

65913 7590 04/14/2008

NXP, B.V.
NXP INTELLECTUAL PROPERTY DEPARTMENT
M/S41-SJ
1109 MCKAY DRIVE
SAN JOSE, CA 95131

EXAMINER	
SUMMONS, BARBARA	
ART UNIT	PAPER NUMBER
2817	

NOTIFICATION DATE	DELIVERY MODE
04/14/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ip.department.us@nxp.com

Office Action Summary	Application No.	Applicant(s)	
	10/574,434	MILSOM ET AL.	
	Examiner	Art Unit	
	BARBARA SUMMONS	2817	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5 and 6* is/are rejected.

7)☒ Claim(s) *4* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 April 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *4/3/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The disclosure is objected to under 37 CFR § 1.77(b) because it does not include the sections of the specification "in order" as required by 37 CFR § 1.77(b). Note that the brief description of Applicants' drawings comes after the detailed description of the invention and immediately before the claims which is inconsistent with the U.S. rules as noted above and in the following guidelines. Appropriate correction is required.

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

(a) TITLE OF THE INVENTION.
(b) CROSS-REFERENCE TO RELATED APPLICATIONS.
(c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
(d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.
(e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC.
(f) BACKGROUND OF THE INVENTION.
    (1) Field of the Invention.
    (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
(g) BRIEF SUMMARY OF THE INVENTION.
(h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
(i) DETAILED DESCRIPTION OF THE INVENTION.
(j) CLAIM OR CLAIMS (commencing on a separate sheet).
(k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
(l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if

the required "Sequence Listing" is not submitted as an electronic document on compact disc).

2. The disclosure is objected to because of the following informalities: On page 3, on line 13, note that "length" should be the plural - - lengths - -. On page 9, on each of lines 6 and 7, note that there is a back end parenthesis ")" which does not have a corresponding front end parenthesis "(". On page 10, on line 22, there appears to be an extraneous "t" which should be deleted. On page 10, on line 27, note that "area" should be the plural - - areas - -. On page 12, on line 2, "lattice" should be - - ladder - - (see e.g. page 9, lines 13-14). Appropriate correction is required.

Claim Objections

3. Claims 1 and 4 are objected to because of the following informalities:

In claim 1, on line 4, "section" should be the plural - - sections - -.

In claim 4, on line 3, for clarity only after "one-and-a-half-", - - times - - should be inserted (see e.g. the specification at page 10, lines 20-23).

Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 2, 5 and 6 are rejected under 35 U.S.C. § 102(b) as being anticipated by Ogawa et al. U.S. 5,260,675 (cited by Applicants).

Figs. 1, 5 and 10 of Ogawa et al. disclose a ladder filter comprising a plurality of bulk acoustic wave (BAW) resonators, each BAW resonator comprising a piezoelectric layer resonator element 5,6 between a bottom electrode 5a,6a and a top electrode 5b,6b, the plurality of BAW resonators comprising in one or more filter sections (Fig. 10) a plurality of series piezoelectric resonators 5 in series between an input terminal 16 and an output terminal 17 of the filter, and one or more shunt piezoelectric resonators 6 being the three left-most shunt resonators in Fig. 10, each connected between a junction between two series resonators and a common terminal 18, the series resonators comprising an input series resonator connected to the input terminal 16, and an output series resonator connected to the output terminal 17, and wherein the shunt piezoelectric resonators 6 are designed to be square so they have an aspect ratio of length/width that is unity (see col. 3, lines 36-40), and the series piezoelectric resonators 5 are designed to be rectangular so that the aspect ratio length/width is different from unity (ibid.).

Regarding claims 5 and 6, the ladder filter is a band-pass filter that is to be used in a radio frequency communication device such as a mobile phone (see col. 8, lines 18-25) that inherently includes a receiver and/or a transmitter device.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claim 3 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Ogawa et al. U.S. 5,260,675 (cited by Applicants) taken together with Bradley et al. U.S. 6,262,637 such that either reference can modify the other and there is no primary reference per se.

Ogawa et al. discloses the invention as discussed above. However, Ogawa does not disclose its filter implemented with thin film bulk acoustic wave resonators (FBARs).

Bradley et al. discloses a ladder filter FBAR array 104 (Fig. 4) that is formed by an upper metallization 83-87 (Figs. 5A) forming the input/output and ground terminals and top electrodes of the resonators, as shown in Figs. 5A and 5B, and a lower metallization 88 and 89, the overlap of the upper and lower metallization layers forming the resonators in a fan shape similar to Applicants' Figs. 10-12 (i.e. rotate Fig. 5A 180°). Additionally, the FBAR ladder filters are used in a duplexer (Fig. 4), being a receiver and transmitter device in a radio frequency device. However, although the shunt resonators

are square and the series resonators are rectangular in Figs. 5A and 5B, Bradley et al. does not discuss the specific dimensions of the series and shunt resonators.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the BAW ladder filter of Ogawa et al. by having provided the resonators of its ladder filter as FBARs with the recited upper and lower metallization layers, as suggested by the exemplary teaching thereof by Bradley (Figs. 4, 5A and 5B) because such an obvious modification would have been the mere substitution of art recognized electrically equivalent acoustic resonators, and wherein FBARs would have provided the advantageous benefit of miniaturization over BAW resonators as would have been known by one of ordinary skill in the acoustic resonator filter art.

It would have been equally obvious to one of ordinary skill in the art at the time the invention was made to have modified the FBAR ladder filter used in a duplexer of Bradley et al. (Figs. 4, 5A and 5B), if even necessary, by having provided that the shunt resonators be designed to be square and have an aspect ratio of length/width that is unity, and the series resonators be designed to have a rectangular shape and hence an aspect ratio of length/width different from unity, as suggested by the exemplary teaching thereof by Ogawa (see col. 3, lines 36-40), because Bradley et al. is silent as to the specific dimensions of its resonators, although the figure (Fig. 5A) shows the shunt resonators to be apparently square and the series resonators rectangular, thereby suggesting to one of ordinary skill that any known aspect ratios such as unity for the shunt resonators and different from unity for the series resonators, as explicitly taught

by Ogawa (ibid.) would have been usable therewith, especially since the resonators of Bradley already appear to have the required shapes and fan-like layout.

Allowable Subject Matter

8. Claim 4 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Aigner et al. U.S. 6,909340 and its equivalent WO 02/43243 disclose a thin film resonator ladder filter wherein at least two of the resonators have different aspect ratios (see e.g. col. 3, lines 46-64) to reduce spurious responses of the filters and discloses preferable aspect ratios (see e.g. col. 4, lines 48-52).

Barber et al. U.S. 6,323,744 discloses a similar layout for a thin film resonator ladder filter with two T-shaped sections (Fig. 4A) including upper and lower metal layers so that all terminals input/output and ground are on the upper layer (Fig. 4B), the series resonators in a row between input 281 and output 282 terminals and again the series resonators appear to be rectangular and in a fan-shaped arrangement.

Lakin U.S. 5,942,958 and Ketcham U.S. 5,231,327 disclose other arrangements of thin film resonators in a ladder filter so that all terminals are on an upper metallization side.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to BARBARA SUMMONS whose telephone number is (571)272-1771. The examiner can normally be reached on M-Th, M-Fr.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bob Pascal can be reached on (571) 271-1769. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

bs
April 8, 2008

/Barbara Summons/
Primary Examiner, Art Unit 2817